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(71) Applicant(s) Smurfit Limited (incorporated in the United Kingdom) Mercer House, Thames Side, WINDSOR, Berkshire, SL4 1QN, United Kingdom	(56) Documents Cited GB 1107200 A GB 1013783 A
(72) Inventor(s) Dennis Morley	(58) Field of Search UK CL (Edition L) B8C CWS6 , B8T TCC TCM TTB INT CL ⁵ B65D 41/62 55/06 55/08 75/58 75/66 75/68 ONLINE DATABASES : WPI
(74) Agent and/or Address for Service J A Kemp & Co 14 South Square, Gray's Inn, LONDON, WC1R 5LX, United Kingdom	

(54) Facilitating removal of shrink sleeve

(57) A tamper-evident shrink sleeve which is removable in one piece comprises a sheet of shrinkable material formed into a sleeve 11 having a line of weakness such as perforations 17 along the sleeve and a line of strength 12, 13 extending closely along each side of the line of weakness. The lines of strength may be formed by a tear tape 13 and the sleeve seam 12, the latter having an overlap 18 under the line of weakness 17. The line of weakness may consist of just a single small cut at the edge of the sleeve.

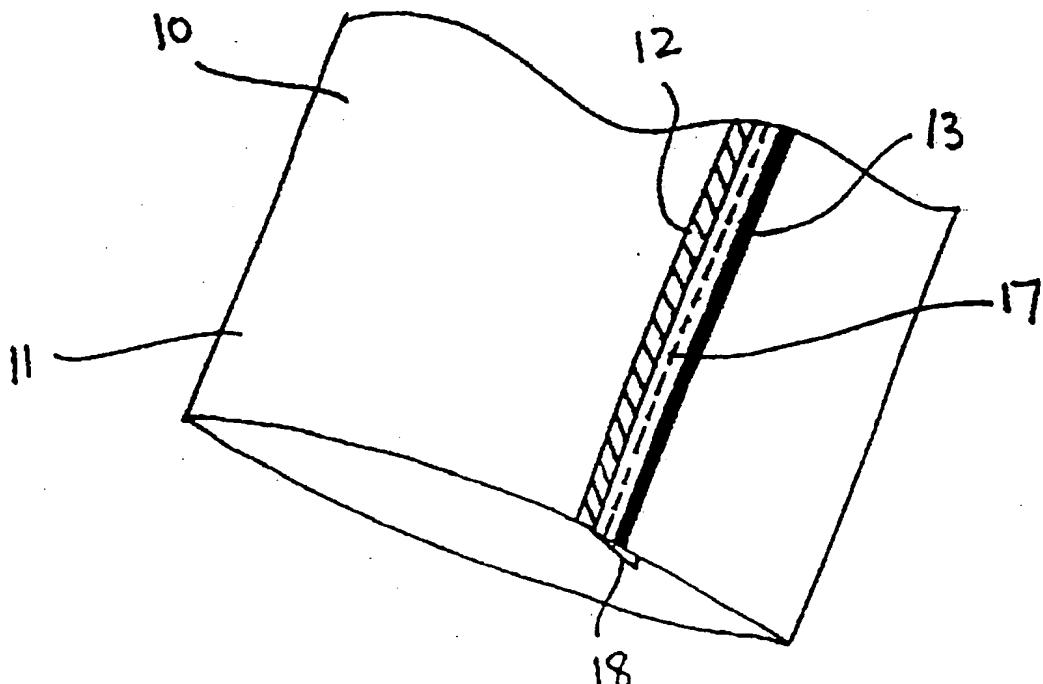


FIG 2

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

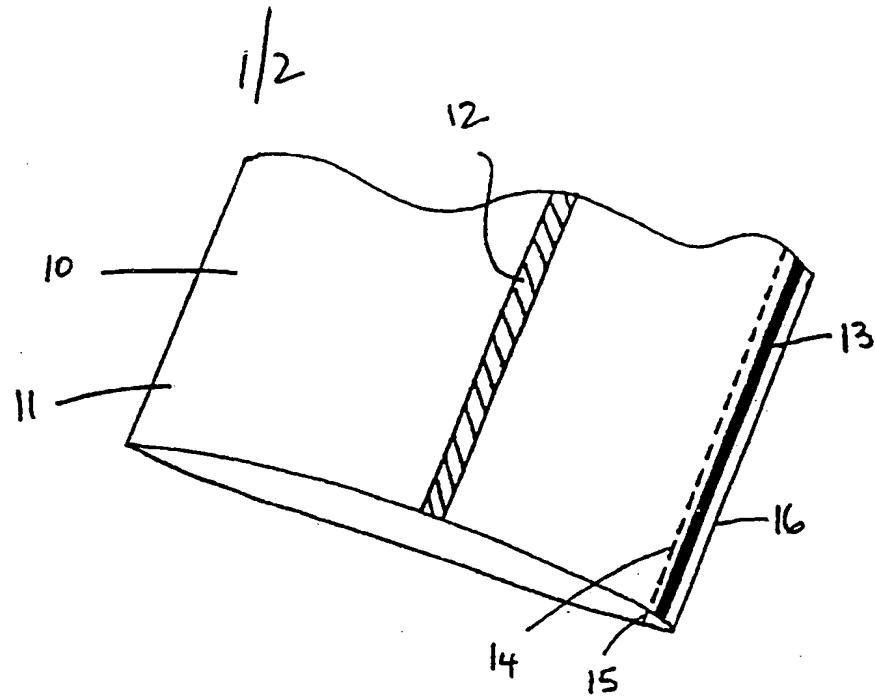


FIG 1
(PRIOR ART)

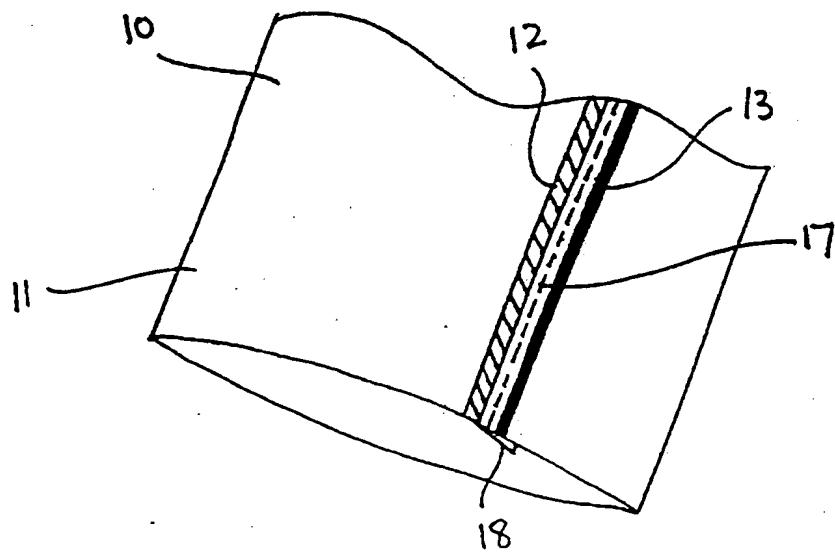


FIG 2

2/2

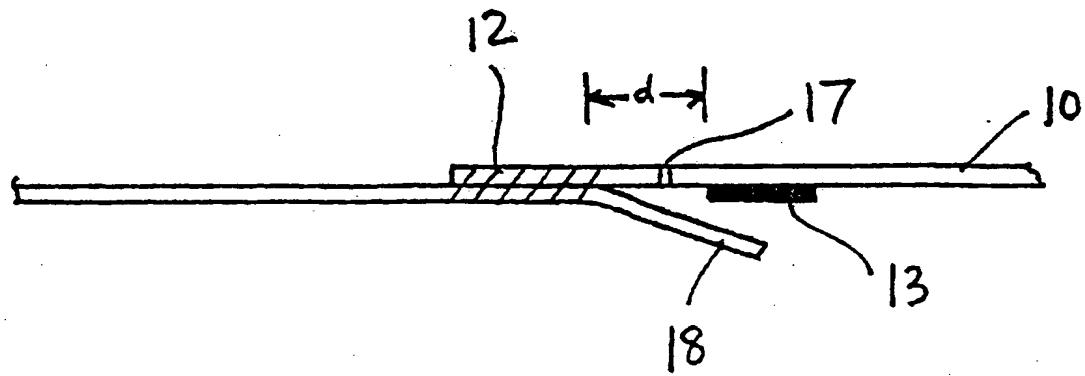


FIG 3

TAMPER-EVIDENT SHRINK SLEEVE

This invention relates to a tamper-evident shrink sleeve.

5 Tamper-evident shrink sleeves have long been used in the packaging industry to prevent products from anonymous interference or opening. The sleeve, which can be transparent, opaque or printed is positioned over the opening of a container and shrunk to form a close-fitting seal. Thus the product cannot readily be tampered with without first removing the seal.

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15 Conventional shrink sleeves incorporate tear-off strips, removal of which requires splitting the seal into two pieces, the tear-off strip itself and the main body of the sleeve. However, recent incidents have exposed the dangers caused by small fragments of transparent film, such as the tear-off strip, particularly with regard to the potential for causing choking in young children.

20 Thus it is an object of the invention to provide a tamper-evident shrink sleeve which overcomes or mitigates this disadvantage.

25 Accordingly, the present invention provides a tamper-evident shrink sleeve which is removable in one piece, comprising a sheet of shrinkable material in the form of a sleeve, the sleeve having a line of weakness

extending along the sleeve and a respective line of strength extending closely along each side of the line of weakness.

5 In the preferred embodiment of the invention the sheet is of heat shrinkable film formed into the sleeve by bonding to provide a bonded seam along the sleeve. In such case one of the lines of strength comprises the bonded seam and the other comprises a tear tape. However, both lines of strength may be 10 seams, or both may be tear tapes. The line of weakness is preferably a line of perforations.

15 Preferably the lines of strength are spaced apart by no greater than about 10 millimeters.

20 An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, wherein:

25 Figure 1 shows one end of a tamper-evident shrink sleeve according to the prior art,

30 Figure 2 shows one end of a tamper-evident shrink sleeve according to the embodiment of the invention, and

35 Figure 3 is an enlarged cross-sectional diagram of the region of the shrink sleeve of figure 2 in the vicinity of the seam, perforations and tear tape.

40 A typical prior art tamper-evident shrink sleeve is shown in figure 1. It comprises a sheet 10 of heat shrinkable film in the form of a sleeve 11. Materials used for the sleeve are usually shrinkable by

heat, the most common ones being PVC (poly vinyl chloride) and PET (poly ethylene teraphthalate) and including OPP (oriented poly propylene) and OPS (oriented poly styrene).

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Although these materials can be extruded into sleeves, it is more common to form flat sheets into sleeves by bonding to form a seam, which allows for a scuff-resistant image to be printed on the inside surface of the sleeve. This is the case in figure 1, where a bonded seam 12 is shown extending along the sleeve. It is to be understood that figure 1 (and figure 2) shows only one end of a usually much longer sleeve which is cut to length as required for the particular article to be packaged.

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The sheet material forming the sleeve is either bonded using solvent glue, or ultrasonically. Since the sleeve is usually formed flat, an overlap (not shown in figure 1) is usually left on the inside to prevent the opposite sides of sleeve being stuck together. The seam 12 has to be strong enough to bear up to material shrinkage, and constitutes a line of strength along the sleeve.

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Shrink sleeves either have perforations to assist with their removal, or a small cut at the top of the sleeve. However, although the perforations may extend the entire length of the sleeve, this will not ensure that the tear follows them (film will tear in whatever direction it is pulled).

20

Therefore, so-called tear tapes (also known as tear strips) have been used to ensure the seal is torn along the sleeve rather than around it. A tear tape is

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5 a narrow strip of material which is bonded to the sheet material alongside the perforations, and constitutes a line of strength along the sleeve. The tear tape may be bonded to the sleeve like a seam, and is usually applied to the inside surface of the sleeve. It is usually coloured to clearly show its position.

1.0 In figure 1 the tear tape is shown at 13. Figure 1 also shows the conventional arrangement for 10 perforations, with two lines of perforations 14, 15 extending one along each side of the tear tape 13. The two lines of perforations are usually formed in a single operation by perforating through the double thickness of film 10 at one edge 16 of the sleeve while 15 the sleeve is flat.

20 As previously stated, a disadvantage of the known sleeve shown in figure 1 is that when the sleeve is removed the entire narrow strip of film 10 between the perforations 14 and 15 is removed to constitute a 25 separate piece.

25 This disadvantage is mitigated by the sleeve according to the embodiment of the invention shown in figures 2 and 3, wherein the same reference numerals have been used as figure 1 for the same or equivalent parts.

30 In figure 2 a single line of perforations 17 extends closely alongside the seam 12, and a tear tape 13 extends closely alongside the perforations 17 on the opposite side to the seam 12. Thus, the figure 2 arrangement is of a single line of perforations 17 "sandwiched" between a seam 12 and a tear tape 13, 35 compared to the figure 1 arrangement which is of a tear

5 tape 13 sandwiched between two lines of perforations 14 and 15.

10 Clearly, since there isn't a line of perforations or other line of weakness near to the tear tape 13 or the seam 12 on the opposite side to the perforations 17, when the sleeve 11 is removed by tearing the tear tape 13 there will only be one tear, along the line of perforations 17, so that the sleeve comes off in one piece. Further, since the line of weakness provided by the perforations 17 is confined between lines of strength constituted by the seam 12 and tear tape 13, the chance of the tear travelling around the sleeve is much reduced.

15 20 25 For best effect the seam 12 and tear tape 13 are spaced apart by a distance d (figure 3) which is no greater than about 10mm, and the line of perforations 17 should preferably be no more than about 5mm from either the seam 12 or the tear tape 13. However, much smaller distances are preferable in many cases, it being quite possible in practice to locate the perforations 17 within 1mm of the seam 12 and tear tape 13, giving an overall distance d of less than 2mm.

30 As shown in figures 2 and 3, the seam 12 has an overlap 18 on the inside of the sleeve 11, backing the line of perforations 17. This protects the seam 12 from the tear.

35 Variations of the above embodiment are possible, within the scope of the invention. For example, the perforations 17 could be sandwiched between two seams 12 or between two tear tapes 13, rather than one of each. Further, the sleeve 11 can be

formed by extrusion, as discussed above, rather than by bonding, in which case two tear strips would preferably be used.

- 5 In a modification of the embodiment described above the perforations 17 do not extend along the entire length of the sleeve 11 in the gap between the seam 12 and the tear tape 13, but only partially along the length of the sleeve, for example about half way along the gap.
- 10 In an extreme case one could use only a single small cut at the edge of the sleeve between the seam 12 and tear tape 13.

CLAIMS:

1. A tamper-evident shrink sleeve which is removable in one piece, comprising a sheet of shrinkable material in the form of a sleeve, the sleeve having a line of weakness extending along the sleeve and a respective line of strength extending closely along each side of the line of weakness.

5 2. A tamper-evident shrink sleeve as claimed in claim 1, wherein the sheet is formed into the sleeve by bonding to provide a bonded seam along the sleeve, and wherein one of the lines of strength comprises the bonded seam.

10 15 3. A sleeve as claimed in claim 2, wherein the seam has an overlap on the inside of the sleeve, backing the line of weakness.

20 4. A tamper-evident shrink sleeve as claimed in claim 1, 2 or 3, wherein one of the lines of strength comprises a tear tape.

25 5. A sleeve as claimed in any preceding claim, wherein the lines of strength are spaced apart by no greater than about 10mm.

6. A sleeve as claimed in any preceding claim, wherein the sheet of material is heat shrinkable.

30 7. A sleeve as claimed in any preceding claim, wherein the line of weakness is a line of perforations.

35 8. A tamper-evident shrink sleeve substantially as described herein with reference to figures 2 and 3 of the accompanying drawings.

Relevant Technical fields

(i) UK CI (Edition L) B8C (CWS6)
B8T (TCC TCM TTB)

(ii) Int CI (Edition 5) B65D 41/62 55/06 55/08 75/58
75/66 75/68

Search Examiner

S R SMITH

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES: WPI

Date of Search

8 FEBRUARY 1993

Documents considered relevant following a search in respect of claims 1 TO 8

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 1107200 (NATIONAL DAIRY) see lines 107 to 120 of page 3, lines 73 to 99 of page 4	1, 2, 4, 5
X	GB 1013783 (B X PLASTICS) see line 115 of page 2 to line 6 of page 3, lines 1 to 4 and 38 to 43 of page 4	1, 4, 5

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

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